
QPC578 Integrated Services Digital Line Card

Introduction

The QPC578 Integrated Services Digital Line Card is a peripheral equipment (PE) device that may be installed in any peripheral shelf or NT8D13 Peripheral Equipment (PE) Module. The ISDLIC interfaces eight digital telephone lines to the Meridian 1 switch. Each line interface is independently configurable by software control using the Multi-line Telephone Administration program (LD 11).

The digital line card supports voice only or simultaneous voice and data service over a single twisted pair of standard telephone wiring. When a digital telephone is equipped with the data option, an asynchronous ASCII terminal or personal computer acting like an asynchronous ASCII terminal can be connected to the system through the digital telephone.

To use the ISDLIC, the following requirements must be met:

- Double density peripheral shelves must be equipped (one shelf per loop).
- The system must run X11 release 7 (or later) or X08 release 10 (or later) software.
- Quadruple density loops must be defined in hardware (SW5 set to ON on the associated peripheral buffer card) and software (LD 17).
- At remote locations using remote peripheral equipment (RPE), the ISDLIC must be QPC578B, series C or higher.

Physical description

The ISDLC circuitry is contained on a 31.75 cm by 25.40 cm (12.5 in. by 10 in.) printed circuit board. The faceplate of the card (see [Figure 48](#)) is equipped with a red light emitting diode (LED) that lights only when the card is disabled.

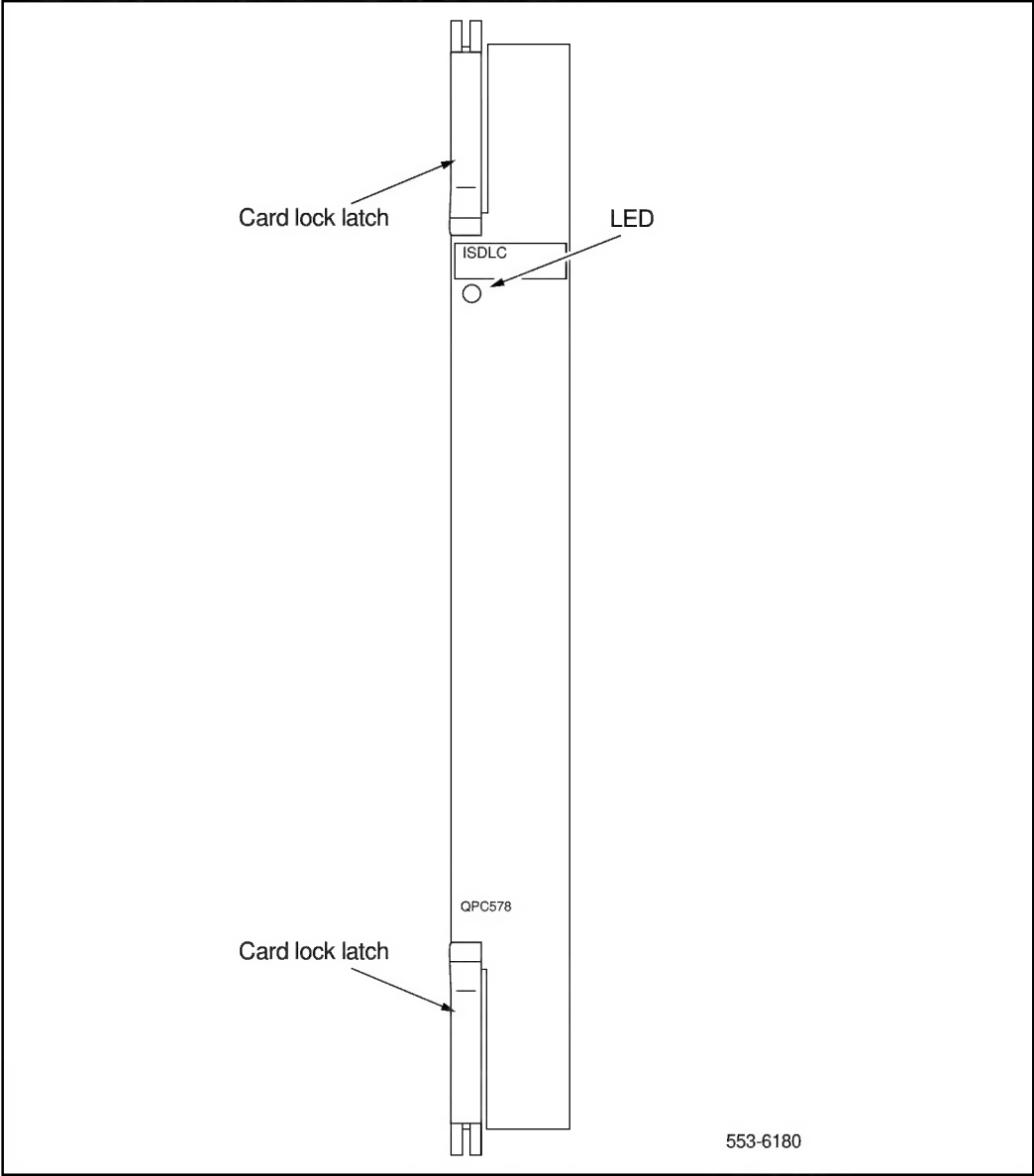
The ISDLC is housed in NT8D13 Peripheral Equipment (PE) Modules (up to 10 cards per module) and QSD65 and QSD80 PE shelves. The following guidelines define the maximum number of ISDLCs allowed for QSD65 and QSD80 PE shelves:

- One PE shelf houses up to six ISDLCs if the remaining slots are used.
- One PE shelf houses up to eight ISDLCs if the remaining slots are not used.
- One QPC82 Power Converter supports up to 18 ISDLCs, provided no other circuit cards require power from this power converter.
- If the QPC82 Power Converter supports other PE cards, the following formula defines the total number of ISDLCs where D, an integer, is the maximum number of ISDLCs allowed and X is the number of other circuit cards (QPC451, for example) associated with the same power converter:

$$D = 3/4 (24 - X)$$

Note: When ISDLCs serve M3000 Touchphones, this restriction does not apply because M3000 Touchphones receive power locally.

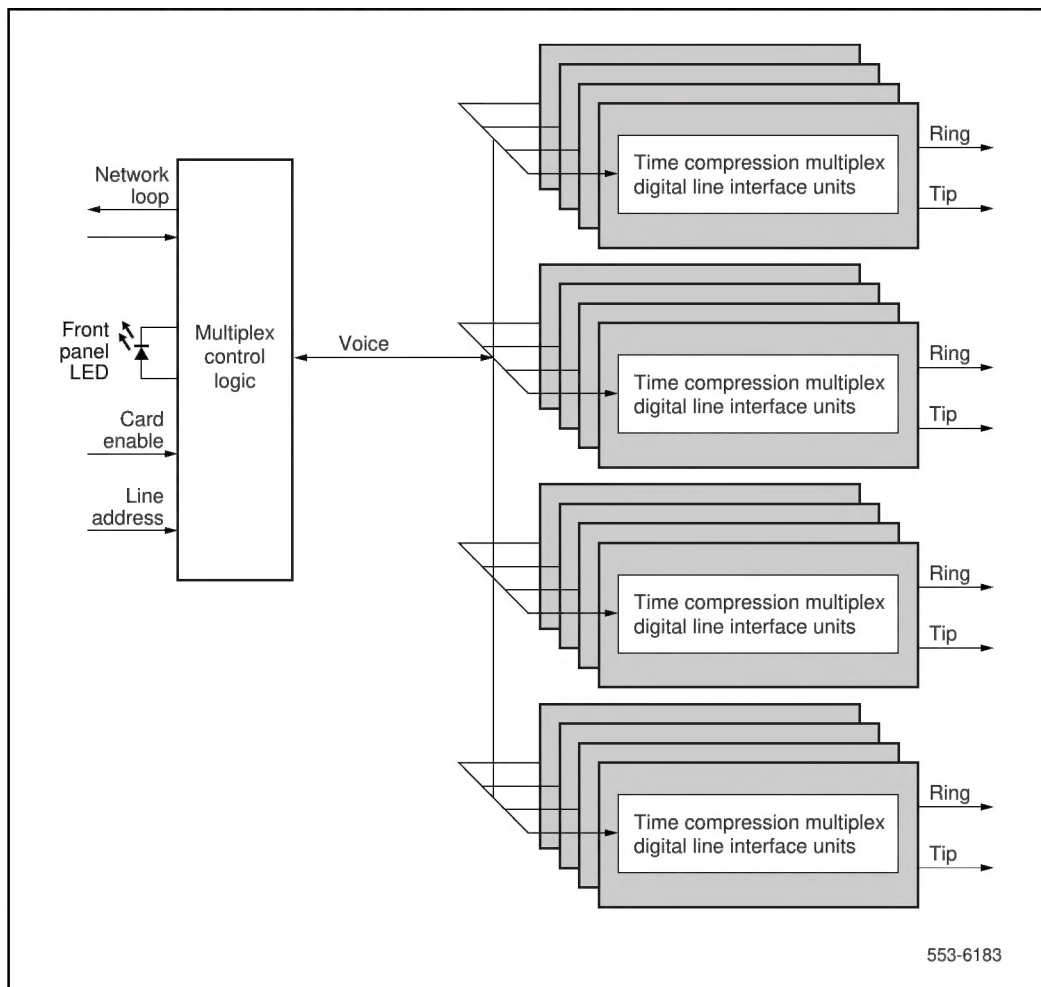
Figure 48
Integrated services digital line card—faceplate



Functional description

[Figure 49](#) shows a block diagram of the major functions contained on the integrated services digital line card. Each of these functions are described on the following pages.

Figure 49
Integrated services digital line card—block diagram



Card interfaces

The integrated services digital line card passes voice, data, and signaling over network loops. This interface is discussed in detail in “Peripheral equipment” on page 23.

Line interface units

The QPC578 ISDLIC is equipped with eight identical line interface units. Each line interface unit provides a multiplexed voice, data, and signaling path to and from digital terminal equipment over a 2-wire full duplex 512 kHz time compression multiplexed (TCM) digital link.

The TCM loop interface circuit provides transformer coupling and foreign voltage protection between the TCM loop and the digital line interface circuit. It also provides battery voltage for the digital telephone set.

Multiplex control

The multiplex control logic is common to all four channels. This logic interfaces the individual line circuits to the peripheral bus signaling channel. Circuits are provided in the multiplex control logic to retiming the digital signals received from the peripheral bus. Circuits are also provided to decode the address information contained on the peripheral bus to enable the individual line circuits during their selected time slots. Further, logic is provided to enable or disable the front panel LED to indicate the service state of the card.

Circuit power

A switching power supply on the QPC578 ISDLIC card takes either the -52 V dc or the -48 V dc input and generates the $+5\text{ V dc}$ and $+10\text{ V dc}$ required by the ISDLIC logic circuits. The $\pm 15.0\text{ V dc}$ inputs to the card are used to power the loop interface circuits.

Electrical specifications

This section lists the electrical characteristics of the integrated services digital line card.

Line interface unit specifications

Table 54 provides a technical summary of the ISDL line interface.

Table 54
Integrated services digital line card—line interface technical summary

Characteristics	Description
Units per card	8 voice/data
Options	None
Impedance	100Ω
Line rate	512 kbps + 100 ppm
Line coding	bipolar return-to-zero alternate mark inversion (BPRZ-AM)
Transmitter output voltage:	
— successive “1” bits	+1.5 ±0.15 V and −1.5 ±0.15 V
— “0” bits	0 ±50 mV

Power requirements

Table 55 shows the maximum power consumed by the QPC578 Integrated Digital Services Line Card. The ISDLC provides +30 V dc over each loop at a maximum current of 60 mA. The line feed interface can supply power to loops of up to 1067 m (3500 ft) in length using 22 or 24 AWG wire; 26 AWG wire is limited to 747 m (2450 ft).

Table 55
Integrated services digital line card—power consumption

Voltage	Current (max.)
–48 V dc or –52 V dc	180 mA
± 6 V dc	50 mA
±15 V dc	500 mA
+10 V dc	50 mA

Foreign and surge voltage protections

The integrated services digital line card does not provide in-circuit protection against power line crosses or lightning strikes. When the card is used to service off-premise telephones, primary and secondary main distribution frame (MDF) protection must be installed. Details on installing protection devices are given in “Off-premise line protection” on page 48. Off-premise telephones served by cable pairs routed through the central office, or crossing a public right-of-way, can be subject to a requirement for on-card protection, and MDF protectors may not be acceptable. Check local regulations before providing such service.

Environmental specifications

Table 56 shows the environmental specifications of the card.

Table 56
 Integrated services digital line card—environmental specifications

Parameter	Specifications
Operating temperature	0° to +60° C (+32 to +140° F), ambient
Operating humidity	5 to 95% RH (noncondensing)
Storage temperature	−40° to +70° C (−40° to +158° F)

Connector pin assignments

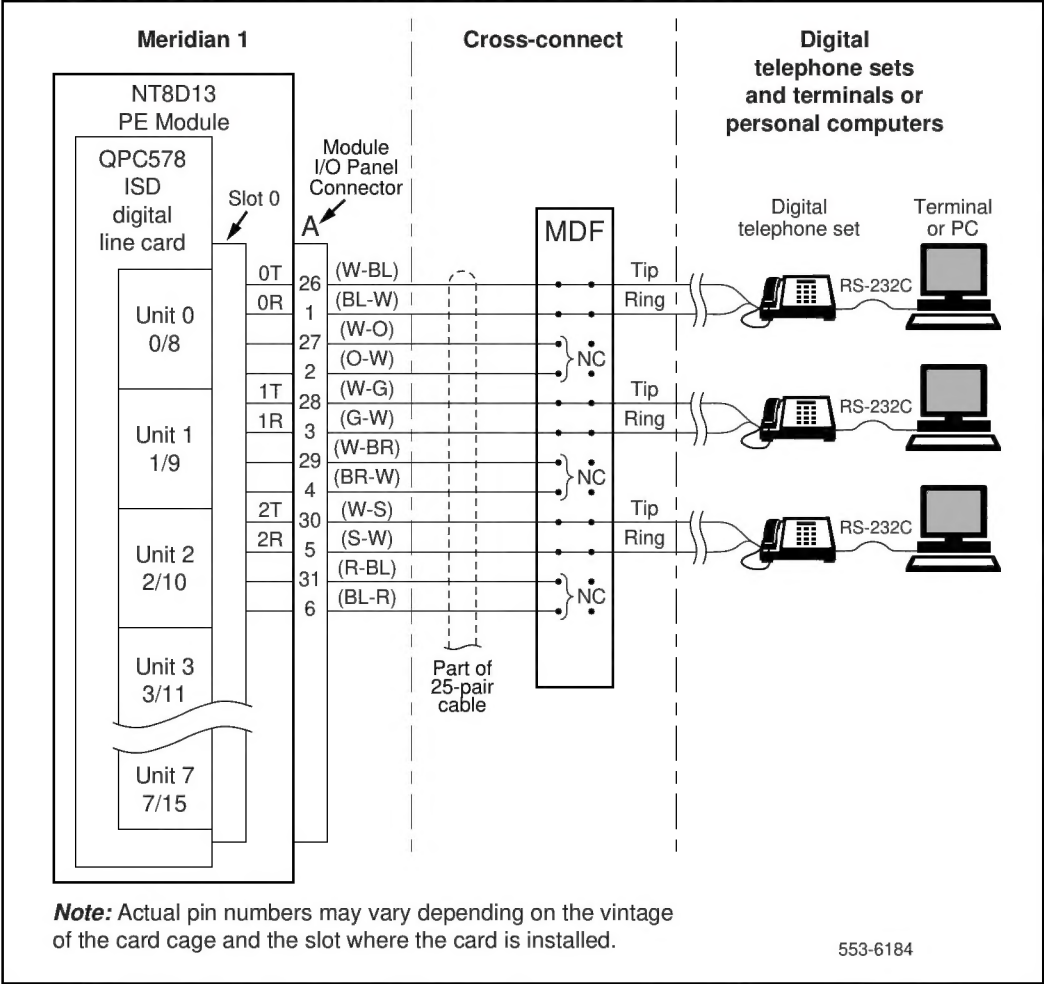
The ISD line card brings the four analog phone lines to the PE backplane through an 80-pin bus. In a PE shelf, the bus lines feed into seven multi-pin connectors that link the line cards to the main distribution frame (MDF), also called the cross-connect terminal. In NT8D13 PE and NT8D11 CE/PE Modules, the backplane connector is cabled to the input/output (I/O) panel linked to the MDF through 25-pair cables.

Telephone lines from station equipment cross connect to the ISD line card at the MDF using a wiring plan similar to that used for trunk cards. A typical connection example is shown in [Figure 50](#), and a list of the connections to the ISD line card are shown in [Table 57](#). See *Meridian 1 system installation procedures* (553-3001-210) for complete I/O panel information and wire assignments for each tip/ring pair.

Table 57
Integrated services digital line card—backplane pinouts

Pin	Signal	Pin	Signal
36A	Line 0, Tip	37A	Line 0, Ring
29A	Line 1, Tip	30A	Line 1, Ring
2A	Line 2, Tip	3A	Line 2, Ring
9A	Line 3, Tip	10A	Line 3, Ring
36B	Line 4, Tip	37B	Line 4, Ring
29B	Line 5, Tip	30B	Line 5, Ring
2B	Line 6, Tip	3B	Line 6, Ring
9B	Line 7, Tip	10B	Line 7, Ring

Figure 50
 Integrated services digital line card—typical connection example



Configuration

This sections outlines the procedures for configuring the switches and jumpers on the QPC578 Integrated Services Digital Line Card and configuring the system software to properly recognize and configure the ISD line card. [Figure 51](#) shows the location of the jumper blocks on this board.

Jumper strap settings

There are no user-configurable jumpers or switches on the ISD line card.

Software service changes

Individual line interface units on the ISD line card are enabled or disabled using the Multi-line Administration program (LD 11). See the *X11 input/output guide* (553-3001-400) for LD 11 service change instructions.

Figure 51
Integrated services digital line card—jumper block locations

